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Environmental Protection
Agency

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**LANDFILL METHANE
OUTREACH PROGRAM**

Pennsylvania State Primer

**A Primer for the
Commonwealth of
Pennsylvania for Developing
Landfill Gas Utilization**



Printed on paper that contains at least
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FOREWARD

Promoting Pennsylvania's indigenous alternative energy resources is a critical mission for the Commonwealth. With full support from Governor Rendell, the Pennsylvania Department of Environmental Protection (DEP) has launched a number of initiatives that encourage the development and use of clean and renewable energy projects from alternative energy sources such as biomass, wind, solar, small-scale hydroelectric, waste-coal, coal-bed methane, and landfill methane gas.

Pennsylvania has encouraged expansion of the use of alternative energy sources, such as landfill methane gas, by increasing the state's purchase of green electricity from 5 percent to 10 percent, beginning July 1, 2004, with a commitment to increase that amount to 20 percent in the future. DEP has recommended that qualifying alternative energy sources include: wind, solar and biomass, as well as landfill methane gas. DEP has also supported the establishment of an Advanced Energy Portfolio Standard, which would require 10 percent of the electricity sold in Pennsylvania to be generated from alternative energy sources. DEP has proposed that landfill methane gas be included in the portfolio.

New funding opportunities such as the Energy Harvest Grant Program have already issued an alternative energy grant for a cogeneration project using landfill methane gas to generate electricity and as a fuel source for heating. Established programs such as the Alternative Fuels Incentive Grant (AFIG) program will continue to provide funding opportunities to landfill operators to install cleaning, liquefying, and distribution equipment for using landfill methane gas as a transportation fuel, as well as covering a percentage of the cost to purchase vehicles that operate on the landfill methane gas.

Finally, Pennsylvania's commitment to financing both large- and small-scale advanced indigenous alternative energy projects was underscored this year by the reauthorization of the Pennsylvania Energy Development Authority (PEDA). PEDA has \$300 million in non-revenue bonding authority.

DEP is embracing advanced alternative energy sources because they will not only help to restore Pennsylvania's environment by ensuring that more power generation comes from environmentally beneficial resources, but will also promote economic development by encouraging investments in clean technologies and fostering the local development and deployment of indigenous energy resources.

Introduction

1. Primer Goals

Throughout the country, the number of landfill gas (LFG) utilization projects is growing. Recovering methane gas at solid waste landfills provides significant environmental and economic benefits by eliminating methane emissions while capturing the emissions' energy value. The methane captured from landfills can be transformed into a cost-effective fuel source for generating electricity and heat, firing boilers, or even powering vehicles.

Permits, incentive programs, and policies for LFG project development vary greatly from state to state. To guide LFG project developers through the state permitting process and to help them take advantage of state incentive programs, the U.S. Environmental Protection Agency's (EPA's) Landfill Methane Outreach Program (LMOP) has worked with state agencies to develop individual primers for states participating in the State Partner Program. By presenting the latest information on federal and state of Pennsylvania regulations and incentives affecting LFG projects in this primer, LMOP and Pennsylvania State Officials hope to facilitate development of many of candidate and potential landfills.

To develop this primer, the Pennsylvania Department of Environmental Protection (DEP) identified all the permits and funding programs that could apply to LFG projects developed in Pennsylvania. It should be noted, however, that the regulations, agencies, and policies described are subject to change. Changes can occur through state legislation or rulemaking or when the federal government proposes new directions for state and local governments. LFG project developers should verify and continuously monitor the status of laws and rules that might affect their plans or the operations of their projects.

1.1. Primer Use

This primer is designed to help facilitate the recovery of LFG in the state of Pennsylvania. It provides information for landfill owners, operators, and developers of LFG projects as well as all other participants such as:

- Engineers
- Utility regulators
- Utility companies
- Community officials
- Equipment vendors
- Public/local environmental groups
- Independent power producers
- State regulators

1.2. Information in the Primer

If you are interested in taking advantage of the economic and environmental opportunities in LFG recovery in Pennsylvania, you will need to know the regulatory requirements that apply.

You will also need to know the economic incentives available to help make these projects more economically viable. To address these needs, this primer covers the following topics:

- *LFG Projects in Pennsylvania*: This section provides information on the Pennsylvania landfills that currently have operating LFG projects.

- *Federal Regulations and Permits:* This section provides information on federal regulations that may pertain to LFG projects, including solid waste, air quality, and water quality regulations.
- *State Regulations and Permits:* This section provides information on DEP permits that apply to LFG recovery projects in Pennsylvania.
- *Local Regulations and Permits:* Local permit approval will often be needed for LFG projects.
- *Federal Incentive Programs:* This section presents information on federal incentives that may apply to LFG projects.
- *State Incentive Programs:* This section presents information about environmental infrastructure financing opportunities in the state of Pennsylvania.
- *Electricity Restructuring:* This section discusses how renewable energy provisions in state electricity restructuring regulations might apply to LFG projects.
- *Voluntary Reporting of Greenhouse Gases:* This section discusses a program allowing organizations to gain recognition for environmental achievements related to greenhouse gas emissions.
- *Environmental Benefits of LFG Recovery:* This section discusses the environmental benefits of LFG recovery for use in the public involvement process to facilitate the approval of necessary permits and local government approvals.

2. Landfill Gas Energy Recovery Benefits and Projects in Pennsylvania

2.1. Landfill Gas Energy Recovery Benefits

The use of landfill gas (LFG) for creating energy has economic and environmental benefits, such as:

- Reducing the use of fossil fuels such as coal and natural gas.
- Reducing methane emissions, which is a potent greenhouse gas.
- Reducing local air pollution.
- Creating jobs, revenues, and cost savings

Despite its many benefits, LFG emitted from decomposing garbage is a reliable and renewable fuel option that remains largely untapped at many landfills. Generating energy from LFG creates a number of environmental and economic benefits:

Directly Reduces Greenhouse Gas Emissions

Municipal solid waste landfills are the largest human-generated source of methane emissions in the United States. Given that all landfills generate methane gas, it makes sense to use the gas for the beneficial purpose of energy generation rather than emitting it into the atmosphere. Methane gas is a very potent greenhouse gas that is a key contributor to global climate change (more than 21 times stronger than CO₂). Methane also has a short (10-year) atmospheric life. Since methane is both potent and short-lived, reducing methane emissions from landfills is one of the best ways to achieve a near-term beneficial impact in mitigating global climate change.

It is estimated that an LFG project will capture roughly 60 to 90 percent of the methane emitted from the landfill, depending on the system design and effectiveness. The captured methane is destroyed (converted to water and the much less potent CO₂) when the gas is burned to produce electricity. The greenhouse gas reduction benefits of a typical 4-megawatt LFG project equate to planting over 60,000 acres of forest per year or removing the annual carbon dioxide emissions from over 45,000 cars. This amount of energy would also offset the use of 1,000 railcars of coal or prevent the use of almost 500,000 barrels of oil.

Directly Reduces Air Pollution

Producing energy from LFG avoids the need to use non-renewable resources such as coal, oil, or natural gas to produce the same amount of energy. LFG projects can reduce gas end-user and power plant emissions of CO₂ and pollutants such as sulfur dioxide (which is a major contributor to acid rain), particulate matter (a respiratory health concern), nitrogen oxides (NO_x), and trace hazardous air pollutants.

It should be noted that LFG electricity generation devices, like all combustion devices, generate some emissions of NO_x, which can contribute to local ozone and smog formation. Depending on the fuels and technologies used by the power plant and the landfill project, the NO_x emission reductions from the power plant may not completely offset the NO_x emitted from the LFG electricity project. However, the overall environmental improvement from LFG electricity generation projects is significant because of the large methane reductions, hazardous air pollutant reductions, and avoidance of the use of limited non-renewable resources such as coal and oil that are more polluting than LFG.

Benefits the Local Economy

Collecting LFG to produce electricity improves the air quality of the surrounding community by reducing landfill odors. Burning LFG to produce electricity also destroys most of the non-methane organic compounds that are present at low concentrations in uncontrolled LFG, thereby reducing possible health risks from these compounds. Gas collection can also improve safety by reducing explosion hazards from gas accumulation in structures on or near the landfill. Generating electricity from existing landfills is also a relatively cost-effective way to provide new renewable energy generation capacity to supply community power needs, and it can create jobs that help build the local economy.

LFG projects generate revenue from the sale of the gas. LFG use can also create jobs associated with the design, construction, and operation of energy recovery systems. LFG projects involve engineers, construction firms, equipment vendors, and utilities or end-users of the power produced. Much of this cost is spent locally for drilling, piping, construction, and operational personnel, helping communities to realize economic benefits from increased employment and local sales. Businesses are also realizing the cost savings associated with using LFG as a replacement for more expensive fossil fuels, such as natural gas. Some companies will save millions of dollars over the life of their LFG energy projects.

Reduces Environmental Compliance Costs

Current regulations under the Clean Air Act require landfills to collect and combust LFG. There are several compliance options, including flaring the gas, or installing an LFG use system. Only LFG energy recovery offers communities and landfill owners the opportunity to reduce the costs associated with regulatory compliance by turning pollution into a valuable community resource.

2.2. LFG Energy Projects in Pennsylvania

The Pennsylvania Department of Environmental Protection (DEP) is a member of the LMOP State Partner Program, which encourages cooperation between EPA and state energy and environmental agencies to promote the development of LFG resources. Pennsylvania's Landfill Gas Recovery Program focuses on facilitating LMOP possibilities by providing regulatory information, state incentives (such as grants), and assisting landfills by identifying end users so they can work together to promote new energy and environmental opportunities from which all Pennsylvania residents will benefit. The operator of a landfill may identify the benefits of a gas project as part of the environmental assessment phase of applications submitted to DEP.

There are currently over 20 landfills in Pennsylvania operating more than 24 LFG recovery projects for beneficial use as of June 2004, with other projects under construction. Based on a 1999 EPA report, there were eight operational direct-use projects delivering 28 million standard cubic feet per day of gas to industrial and commercial end users. According to the DEP, at least 20 additional landfills have the potential to operate an economically viable gas recovery system.

In 1986, the Greater Lebanon Refuse Authority Landfill started an LFG recovery project for the beneficial use of methane gas, making it the first landfill in Pennsylvania to do so. The beneficial use of methane gas has a broad scope. At the Lycoming County Landfill, LFG is used to fuel two on-site boilers, which heat buildings, such as the recycling center, during cold weather. A common use for LFG in Pennsylvania is burning the gas to produce electricity. The electricity is either sold to a local power utility that incorporates the electricity onto the electrical grid system or is used by the generating facility.

In addition to the electrical power provided by these landfills, economic benefits from these projects create jobs and tax revenue. Earlier this year, the EPA conducted a study in Pennsylvania to determine the economic benefits of the average 3 MW electricity project. This study reviewed direct, indirect, and induced economic affects throughout the entire supply chain of the project. The study estimated the construction costs and annual operating costs of a typical LFG electricity project and used readily available economic multipliers to estimate total effects on the local and state economy and employment. The results of the study, highlighted below, are intended to be a general approximation for a typical project rather than a detailed analysis of an individual project.

- Direct spending during construction for locally purchased materials and five full time equivalents (FTE) of construction labor is \$900,000. Considering ripple effects, this spending adds about \$2.3 million to Pennsylvania's total output (overall production), up to \$1,558,000 in earnings, and more than 14 jobs during construction of the project.
- Nationally, each 3 MW project is estimated to increase output by \$14 million, earnings by \$3.5 million and add 90 jobs during the construction phase.
- Once in operation, the plant will add a \$220,000 payroll to the local economy, which generates \$913,000 in earnings statewide.
- Corporate and personal income taxes on the plant payroll generate about \$13,800 in state revenues.
- Property taxes and school district taxes generate about \$14,400 for local governments.
- Revenues from the indirect and induced earning would be about three times these amounts.

In Pennsylvania, the Wayne Township Landfill in 2000 devised an innovative yet simple approach to solving potentially harmful emissions from the landfill. The Solid Waste Authority partnered with the Jersey Shore Steel Company to capture and utilize LFG as an alternative source of energy. The LFG is currently being used as a medium-Btu gas for reheating railroad rails to create a high-quality angle iron. The landfill provides approximately 600 cubic feet per minute to the mill, or 18 million Btu per hour.

The following table describes the projects at Pennsylvania's 21 landfills currently operating an LFG recovery project.

Table 2.1 Pennsylvania Landfills Currently Operating a Gas Recovery Project

| Landfill Name | Methane Use | Beneficial Use |
|---|-------------|---|
| Amity Landfill, Environmental & Recycling Services, Residual Waste LF | Electricity | Production of electricity |
| Bradford County Landfill | Electricity | Production of electricity |
| Commonwealth Environmental Systems (CES) Landfill | Direct Use | Under-construction production of electricity. Generating steam used to convert raw potatoes into dehydrated flakes. |
| Dauphin Meadows Landfill | Direct Use | Leachate evaporation |
| Grand Central Sanitary Landfill | Electricity | Production of electricity |
| Greater Lebanon Refuse Authority Landfill | Electricity | Production of electricity |
| Greenridge Reclamation | Direct Use | Leachate evaporation |
| GROWS Landfill | Direct Use | Pipeline to gas utility |
| Keystone Landfill | Electricity | Production of electricity, power sold to wholesaler and a plastic manufacturer |
| Lake View Landfill | Electricity | Production of electricity, used on site, surplus sold to power company |
| Lycoming County Landfill | Electricity | Production of electricity |
| Lycoming County Landfill | Direct Use | Used to heat building |
| Modern Landfill | Electricity | Production of electricity, used on site, surplus sold to power company |
| Monroeville Landfill | Direct Use | Pipeline to gas utility |
| Mountain View Landfill | Electricity | LFG blended with petroleum-based liquid fuel for production of electricity |

| | | |
|------------------------------------|-------------|---|
| Pottstown Landfill | Electricity | Production of electricity |
| Rolling Hills Landfill | Electricity | Under construction for production of electricity |
| Southern Alleghenies Landfill | Direct Use | Leachate evaporation |
| Superior (Onyx) Greentree Landfill | Direct Use | Under construction. Pipeline to gas utility |
| Tullytown Landfill | Direct Use | Pipeline to gas utility |
| Valley Landfill | Direct Use | Pipeline to gas utility |
| Wayne Township Landfill | Direct Use | Piped to a steel company for use as a fuel source |

The following photographs depict a recently operational LFG recovery facility in Pennsylvania.

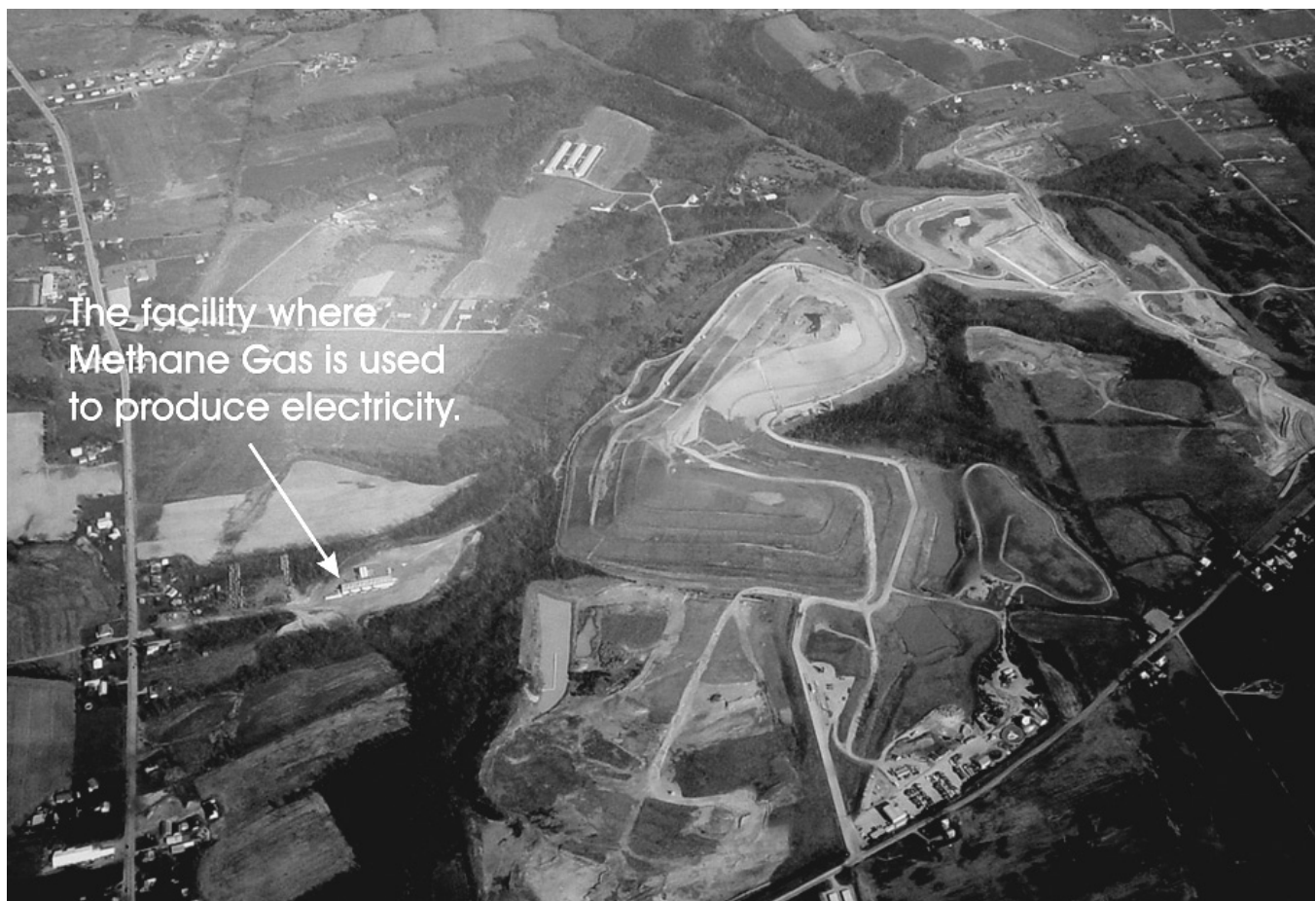


Figure 1—An aerial view of a landfill with the surrounding industry and the LFG recovery and conversion project at Mountain View in Pennsylvania. Methane gas is sent to the INGENCO Distributed Energy facility through approximately one mile of pipe.



Figure 2—Indicates several engines at INGNECO, which run by methane gas, turning generators for electric production that is placed onto the electrical grid system.

2.3. Candidate Facilities for LFG Utilization Projects

At least 20 landfills have been identified as candidates for LFG projects in Pennsylvania. These landfills meet the minimum volume/tonnage requirements for being able to produce an adequate LFG supply. However, nearly all operating landfills in Pennsylvania have the capability to provide sufficient LFG depending on the size and scope of the proposed project. The location of all operating municipal waste landfills can be found on the Department's Web site at:

www.dep.state.pa.us/dep/deputate/airwaste/wm/MRW/Docs/Landfill_list.htm

For more information about LFG utilization projects in Pennsylvania, contact the Pennsylvania Department of Environmental Protection at:

Bureau of Land Recycling & Waste Management
Division of Municipal & Residual Waste
P.O. Box 8472
Harrisburg, PA 17105-8472
(717) 787-7381

Or consult the Department Web site at:

www.dep.state.pa.us/lmop

3. Landfill Methane Outreach Program

To promote the use of LFG as an energy source, EPA has established the Landfill Methane Outreach Program (LMOP). The goals of LMOP are to reduce methane emissions from landfills by:

- Encouraging environmentally and economically beneficial LFG project development.
- Removing barriers to developing LFG projects.

To achieve these goals, EPA establishes alliances with four key constituencies:

- State environmental and energy agencies.
- Energy users/providers (including investor owned, municipal and other public power utilities, cooperatives, direct end users, and power marketers).
- Industry (including developers, engineers, and equipment vendors).
- Community partners (municipal and small private landfill owners and operators, cities, counties, and other local governments, and community groups).

EPA establishes these alliances through a Memorandum of Understanding (MOU). By signing the MOU, each Partner acknowledges a shared commitment to promoting LFG energy recovery at solid waste landfills, recognizes that the widespread use of LFG as an energy resource will reduce methane and other air emissions, and commits to certain activities that enhance the development of this resource.

As of December 2004, more than 380 operational LFG energy projects in the United States and EPA estimates that more than 600 landfills across the United States could install economically viable LFG projects.

4. Further Information

For further information about the Landfill Methane Outreach Program, contact:

U.S. Environmental Protection Agency
Landfill Methane Outreach Program (6207J)
1200 Pennsylvania Avenue, N.W.
Washington DC 20460
(888) STAR-YES (782-7937), Fax (202) 565-2077
www.epa.gov/lmop

Part I—Regulations and Permits

1. Overview of Federal Regulations and Permits

The following section discusses federal regulations that may pertain to landfill gas (LFG) projects. LFG projects may be subject to solid waste, air quality, and water quality regulations. The federal regulations are presented in general terms because individual state/local governments generally develop their own regulations for carrying out the federal mandates. Specific requirements may therefore differ among states. Project developers will need to contact relevant federal agencies and, in some cases, state agencies for more detailed information and applications.

The discussion of each key federal regulation/permit contains three components:

- Importance of the regulation/permit to LFG project developers
- Applicability to LFG projects
- Description of each regulation/permit

1.1. Clean Air Act

The Clean Air Act (CAA) regulates emissions of pollutants to protect public health and the environment. The CAA contains three provisions that may affect LFG projects. The first two provisions, the New Source Performance Standards (NSPS)/Emission Guidelines (EG) and New Source Review (NSR), are currently in effect. The third provision, the Maximum Achievable Control Technology (MACT) standard, was proposed and finalized.

Facilities planning to construct a new LFG system or those planning to modify a landfill operation to incorporate an LFG system must obtain a Construction and Operating Permit from the responsible air regulatory agency if emissions from the project exceed the major facility emission thresholds. The Construction and Operating Permit specifies the NSPS/EG, and NSR requirements that the project must meet. The general requirements of the NSPS/EG, NSR, and Title V for LFG projects are discussed below.

NSPS and EG for Municipal Solid Waste Landfills

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| Importance | LFG projects can be part of a compliance strategy to meet EPA's emissions standards for LFG. |
| Applicability | Landfills meeting certain design capacity, age, and emissions criteria are required to collect LFG. Numerous control options to combust LFG are provided to landfill owner/operators, including but not limited to LFG projects. |
| Description | <p>EPA final regulations under the CAA amendments require affected landfills to collect and control LFG. Specifically, landfills that are 2.5 million mega grams and 2.5 million cubic meters in size and have estimated emissions of non-methane organic compounds (NMOC) of at least 50 mega grams per year must reduce their emissions of LFG. The regulations identify NMOC as a surrogate for LFG. Therefore, the emission reductions required in the rules are specified as reductions of NMOC.</p> <p>LFG emissions are targeted in these rules because of the potential negative impact on human health and the environment from the volatile organic compounds contained in the</p> |

gas. In addition, the contribution of LFG to local smog formation, local odors, and potential explosives were included in the decisionmaking process. Finally, the potential for landfill fires was also factored into the decision.

For landfills that received waste after November 8, 1987 (“existing landfills”), the Emission Guidelines (40 CFR Part 60 Subpart Cc) apply. For landfills that commenced construction, reconstruction, or modification on or after May 30, 1991 (“new landfills”), the New Source Performance Standards (40 CFR Part 60 Subpart WWW) apply. The collection and control requirements in each of these standards are the same; only the start of the compliance clock differs.

The final regulations can be found in the Federal Register, March 12, 1996, Vol. 61, No. 49, pages 92579262.

The basic requirements are the same for both existing and new landfills. Landfills that meet both of the following criteria must comply with the regulations.

- Capacity. Maximum design capacity greater than or equal to 2.5 million Mg (and 2.5 million cubic meters, about 2.75 million tons). If NMOC emissions are less than 50 Mg for a facility greater than 2.5 million Mg and 2.5 million cubic meters, reporting is required. If the annual emissions are 50 Mg or more for these landfills, collection and control of LFG are required.¹
- Emissions. Annual NMOC emission rate is greater than 50 Mg (about 55 tons).

Air Emissions: New Source Review Permitting Process

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| Importance | New LFG projects may be required to obtain construction permits under New Source Review (NSR). Depending on the area in which the project is located, obtaining these permits may be the most critical aspect of project approval. |
| Applicability | The combustion of LFG results in emissions of carbon monoxide, oxides of nitrogen, and particulate matter (PM ₁₀). Requirements vary for control of these emissions depending on local air quality. The relevant standards for a particular area will be discussed in Section 2, State Standards and Permits. Applicability of these standards to LFG projects will depend on the level of emissions resulting from the technology used in the project and the project’s location (i.e., attainment or non-attainment area). |
| Description | <p>CAA regulations require new stationary sources and modifications to existing sources of certain air emissions to undergo NSR before they can operate. The purpose of these regulations is to ensure that sources meet the applicable air quality standards for the area in which they are located. Because these regulations are complex, a landfill owner or operator or the owner/operator of the LFG project may want to consult an attorney or expert familiar with NSR for more information about permit requirements in a particular area.</p> <p>The existing CAA regulations for attainment and maintenance of ambient air quality standards regulate six criteria pollutants: ozone, nitrogen dioxide (NO₂), carbon monoxide (CO), particulate matter (PM₁₀), sulfur dioxide (SO₂), and lead. The CAA authorizes the EPA to set National Ambient Air Quality Standards (NAAQS) for each of the six criteria pollutants. Areas that meet the NAAQS for a particular air pollutant are classified as being in “attainment” for that pollutant and those that do not are in “non-attainment.” Because</p> |

¹ Class I areas are specified under the Clean Air Act and include national parks. Projects situated within a certain distance from Class I areas are subject to more stringent criteria for emissions levels.

each state is required to develop an air quality implementation plan (called a State Implementation Plan or SIP) to attain and maintain compliance with the NAAQS in each Air Quality Control Region within the state, specific permit requirements will vary by state. However, the minimum requirements of the federal permitting regulations must still be met. (See 40 CFR 51.16051.166 for more information.)

The location of the LFG project will dictate what kind of construction and operating permits are required. If the LFG project is located in an area that is in attainment for a particular pollutant, the LFG project must undergo Prevention of Significant Deterioration permitting for that pollutant (and possibly others). Non-attainment Area permitting is required for those LFG projects that are located in areas that do not meet the NAAQS for a particular air pollutant. Furthermore, the level of emissions from the project determines whether the project must undergo major NSR or minor NSR. The requirements of major NSR permitting are greater than those for minor NSR. The following provides more detail on new source permits.

Prevention of Significant Deterioration Permitting

Prevention of Significant Deterioration (PSD) review is used in attainment areas to determine whether a new or modified emissions source will cause significant deterioration of local air quality. The State air office can assist LFG project developers in determining whether a proposed project requires PSD approval.

All areas are governed to some extent by PSD regulations, because no location is in non-attainment for all criteria pollutants. At this time, applicants must determine PSD applicability for each individual pollutant based on its attainment/non-attainment status. For gas fired sources, a PSD major NSR is required if the new source will emit or has the potential to emit any criteria pollutant at a level greater than 250 tons per year (unless it is a listed source category).

If the source is considered major, the PSD major NSR permit process is required for the major pollutant (except for a non-attainment pollutant) and any other pollutant emitted in significant amounts. This process requires in part that applicants determine the maximum degree of reduction achievable through the application of available control strategies. Major sources generally must undergo the following PSD steps:

- Best Available Control Technology (BACT) analysis
- Monitoring of local air quality
- Source impact analysis/modeling
- Additional impact analysis/modeling (i.e., impact on vegetation, visibility and Class I areas)²

Minor sources (i.e., below 100/250 tons per year) are exempt from this process, but these sources may still be required to obtain a construction and operating air permit. See 40 CFR 52.21 for more information on PSD.

Non-attainment Air Permitting

A source locating in an area that has been designated non-attainment for one or more of the six criteria pollutants may be subject to the non-attainment NSR for such pollutants. Ozone is the most pervasive non-attainment pollutant and the one most likely to affect LFG projects. A proposed new emissions source, or modification of an existing source located in a non-attainment area, must undergo a non-attainment major

² Class I areas are specified under the Clean Air Act and include national parks. Projects situated within a certain distance from Class I areas are subject to more stringent criteria for emissions levels.

NSR if the new source or the modification is classified as major (i.e., if the new or modified source exceeds specified emissions thresholds, typically 100 tons per year, but lower in some cases for VOC/NO_x and PM-10). To obtain a non-attainment NSR permit for criteria pollutants, a project must meet several requirements:

- Use technology that achieves the Lowest Achievable Emissions Rate (LAER) for the non-attainment pollutant.
- Arrange for an actual emissions reduction at an existing combustion source that offsets the emissions from the new project at specific ratios.

Title V Operating Permit

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| Importance | LFG projects will likely be part of a source that is required to obtain an operating permit under Title V of the CAA. Regulations implementing this Title can be found at 40 CFR parts 70 and 71. |
| Applicability | A source becomes subject to Title V permitting as a result of triggering one or more of the applicability criteria found in 40 CFR 70.3 or 71.3. For example, if a source is a major source under section 112, section 302, or part D of Title I, then the source is required to obtain a Title V permit. The 12 month deadline for submitting a timely and complete Title V application is triggered by the criterion in 40 CFR 70.3 or 71.3 which first causes a source to become subject to Title V. |
| Description | Title V permits incorporate the requirements of the CAA that apply to a source and clarify how these requirements apply. In the process of applying for a Title V permit, many sources have discovered that they are out of compliance with various applicable requirements. The regulations at 40 CFR parts 70 and 71 require sources to self certify compliance with applicable requirements initially and annually and provide an opportunity for the public to comment on whether a source is complying with its applicable requirements. A permit requires a source to promptly report deviations from the permit and helps ensure ongoing emissions reductions at the source. |

1.2. Resource Conservation and Recovery Act (Subtitle D)

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|----------------------|---|
| Importance | Before an LFG project can be developed, all Resource Conservation and Recovery Act (RCRA) Subtitle D requirements (i.e., requirements for non hazardous waste management) must be satisfied. |
| Applicability | Methane is explosive in certain concentrations and poses a hazard if it migrates beyond the landfill facility boundary. LFG collection systems must meet RCRA Subtitle D standards for gas control. |
| Description | <p>In October 1979, federal regulations were promulgated under Subtitle D of RCRA that required controls on migration of LFG. In 1991, EPA promulgated landfill design and performance standards; the newer standards apply to municipal solid waste landfills that were active on or after October 9, 1993. Specifically, the standards require monitoring of LFG and establish performance standards for combustible gas migration control. Monitoring requirements must be met at landfills not only during their operation, but also for a period of 30 years after closure.</p> <p>Landfills affected by RCRA Subtitle D are required to control gas by establishing a program to periodically check for methane emissions and prevent offsite migration. Landfill owners and operators must ensure that the concentration of methane gas does not exceed:</p> |

- Twenty-five percent of the lower explosive limit for methane in facilities' structures.
- The lower explosive limit for methane at the facility boundary.

Permitted limits on methane levels reflect the fact that methane is explosive within the range of 5 to 15 percent concentration in air. If methane emissions exceed permitted limits, corrective action (i.e., installation of an LFG collection system) must be taken. Subtitle D may provide an impetus for some landfills to install energy recovery projects in cases where a gas collection system is required for compliance. See 40 CFR Part 258 for more information.

1.3. National Pollutant Discharge Elimination System (NPDES) Permit

| | |
|----------------------|---|
| Importance | LFG projects may need to obtain NPDES permits for discharging wastewater that is generated during the energy recovery process. |
| Applicability | LFG condensate forms when water and other vapors condense out of the gas stream due to temperature and pressure changes within the collection system. This wastewater must be removed from the collection system. LFG projects may also generate wastewater from system maintenance and cooling tower blow down. |
| Description | <p>NPDES permits regulate discharges of pollutants to surface waters. The authority to issue these permits is delegated to state governments by EPA. The permits, which typically last five years, limit the quantity and concentration of pollutants that may be discharged. To ensure compliance with the limits, permits require wastewater treatment or impose other operation conditions. State water offices or EPA regional office can provide further information on these permits.</p> <p>The permits are required for three categories of sources and can be issued as individual or general permits. LFG projects would be included in the "wastewater discharges to surface water from industrial facilities" category and would require an individual permit. An individual permit application for wastewater discharges typically requires the following information:</p> <ul style="list-style-type: none"> • Water supply volumes • Stormwater treatment • Water utilization • Plant operation • Wastewater flow • Materials and chemicals used • Characteristics and disposal methods • Production • Planned improvements • Other relevant information |

1.4. Clean Water Act, Section 401

| | |
|----------------------|---|
| Importance | LFG projects may need CWA Section 401 certification for constructing pipelines that cross streams or wetlands. |
| Applicability | LFG recovery collection pipes or distribution pipes from the landfill to a nearby gas user may cross streams or wetlands. If the construction or operation of such pipes causes any discharge of sediment into streams or wetlands, Section 401 certification may be required. |
| Description | <p>Any construction or operation of facilities that results in any discharge into streams or wetlands is regulated under Section 401. This requirement may affect the construction of LFG project facilities or pipelines to transport LFG.</p> <p>The applicant must obtain a water quality certification from the state in which the discharge will originate. The certification should then be sent to the U.S. Army Corps of Engineers. The certification indicates that such discharge will comply with the applicable provisions of Sections 301, 302, 303, 306 and 307 of the Clean Water Act (CWA).</p> |

1.5. Other Federal Permit Programs

The following are brief descriptions of how other federal permits could apply to LFG project development:

- RCRA Subtitle C could apply to an LFG project if it produces hazardous waste. While some LFG projects can return condensate to the landfill, many dispose of it through the public sewage system after some form of onsite treatment. In some cases, the condensate may contain high enough concentrations of heavy metals and organic chemicals for it to be classified as a hazardous waste, thus triggering federal regulation.
- The Historic Preservation Act of 1966 or the Endangered Species Act could apply if power lines or gas pipelines associated with a project infringe upon an historic site or an area that provides habitat for endangered species.

2. State of Pennsylvania Regulations and Permits

This section provides information on permits required by the Pennsylvania Department of Environmental Protection (DEP) for the development of a landfill gas (LFG) project.

2.1. Municipal Waste Permits

Applicability to LFG Projects

A person or municipality may not operate a municipal waste processing or disposal facility unless the person or municipality has first applied for and obtained a permit from the DEP for the facility. AN LFG recovery project is considered a processing operation and the permit may be obtained through modification of the landfill's operating permit or through a general permit for processing and/or beneficial use.

Agency Contact

Department of Environmental Protection
Bureau of Land Recycling & Waste Management
Division of Municipal and Residual Waste
P.O. Box 8472
Harrisburg, PA 17105-8472
(717) 787-7381

Description

The municipal waste regulations require that the operator implement an LFG management plan to address gas monitoring and control. If gas recovery and reuse are proposed as part of the LFG management plan, the plan must include drawings and a narrative detailing the location and design of components of the system. If the landfill operator will be managing the gas recovery and reuse, the project may be approved through modification of the existing landfill permit. This can be a major or minor permit modification depending on the existing landfill permit related to design and operation. If a third party is managing the gas recovery and reuse project, the operator is required to provide the information as part of a separate application, normally a general permit for beneficial use. To facilitate the recovery and reuse of LFG, DEP has developed two general permits for the processing and beneficial use of LFG as a substitute for natural gas or other fuel (WMGM001 or WMGM002).

Statute/Regulation

Solid Waste Management Act (35 P.S. § 6018.105(a))
Municipal Waste Regulations, 25 Pa. Code, Chapters 271 through 285
The regulations are available at the following Web address:
www.pacode.com/secure/data/025/025toc.html

Information Required/Suggestions

The municipal waste regulations also require the operator to demonstrate sufficient financial responsibility for the operation of processing and disposal facilities. Any LFG collection system will be included in the financial assurance costs.

DEP strongly encourages all persons interested in obtaining a waste management permit to first contact the appropriate Regional Office to schedule a pre-application meeting to discuss the permitting procedures. Locations of DEP Regional Offices can be found in the following Web address.

www.dep.state.pa.us/dep/deputate/fieldops/default.htm

Application Process

Technical guidance and forms can be obtained from the DEP Web site at:
www.dep.state.pa.us/dep/deputate/airwaste/wm/MRW/MRW.htm

Public Input/Participation

Permit applications may be subject to any or all of the following: notice in the Pennsylvania Bulletin or other publication of general circulation; a public meeting; and a public hearing. These opportunities for public input are often required by regulation or statute, but may also occur at the discretion of the Department.

Review/Approval Period

For general permits, 60 days for a determination of applicability under an existing general permit and 160 days for a new general permit. The review period for a landfill permit modification is 140 days but may be variable depending upon whether the application is for a minor or major permit modification.

Fees

\$500 for a determination of applicability under the existing general permits related to the processing and beneficial use of LFG. \$300 for a minor modification to an existing landfill operating permit. \$7,800 for a major modification to an existing landfill operating permit.

2.2. Bureau of Air Quality (AQ) Regulation

As stated in Pa. Code Title 25 §127.11 (Plant approval requirements), the construction of either a landfill or a gas collection system will require the submission of a Plan Approval application and subsequent approval by the Department. Pa. Code Title 25 §127.1 requires that the emissions of new sources, including landfills, shall be controlled to the maximum extent possible, consistent with the best available technology (BAT) as determined by the Department as of the date of issuance of the Plan Approval for the new source. Once compliance has been demonstrated, a five-year Air Quality Operating Permit will be issued.

The following DEP Web address contains the requirements for an AQ permit:

www.dep.state.pa.us/dep/deputate/airwaste/aq/permits/plan/Inst_pln.pdf

Title V Operating Permits

Title V facility

A stationary air contamination source, or a group of stationary sources, located on one or more contiguous or adjacent properties, which are under common control of the same person (or persons under common control), belonging to a single major industrial grouping and that are described in subparagraph Title V. For the purposes of this definition, a stationary source or group of stationary sources will be considered part of a single industrial grouping if the air contaminant emitting activities at the source, or group of sources, on contiguous or adjacent properties belong to the same major group, (i.e., all have the same two-digit code, as described in the Standard Industrial Classification Manual, 1987).

- (i) A major stationary source under section 112 of the Clean Air Act, is defined as one of the following:
 - (A) For air contaminants other than radionuclides, a stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit, in the aggregate, 10 tons per year (tpy) or more of any hazardous air pollutant, including any fugitive emissions of the pollutant, which has been listed under section 112(b) of the Clean Air Act, 25 tpy or more of a combination of the hazardous air pollutants, including any fugitive emissions of the pollutants, or the lesser quantity as the Administrator of the EPA may establish by regulations promulgated under the Clean Air Act. Notwithstanding the above, emissions from an oil or gas exploration or production well, with its associated equipment and emissions from a pipeline compressor or pump station, may not be aggregated with emissions from other similar units, whether or not the units are in a contiguous area or under common control, to determine whether the units or stations are a major source.
 - (B) For radionuclides, the meaning specified by the Administrator of the EPA in regulations promulgated under the Clean Air Act.

- (ii) A major stationary source of air pollutants, as defined in section 302 of the Clean Air Act (42 U.S.C.A. § 7602), that directly emits or has the potential to emit, 100 tpy or more of any air contaminant, including a major source of fugitive emissions of the pollutant, as determined by regulations established under the Clean Air Act. The fugitive emissions of a stationary source may not be considered in determining whether it is a major stationary source for the purposes of section 302(j) of the Clean Air Act, unless the source belongs to one or more of the following categories of stationary source:
- (A) Coal cleaning plants, with thermal dryers
 - (B) Kraft pulp mills
 - (C) Portland cement plants
 - (D) Primary zinc smelters
 - (E) Iron and steel mills
 - (F) Primary aluminum ore reduction plants
 - (G) Primary copper smelters
 - (H) Municipal incinerators capable of charging more than 250 tons of refuse per day
 - (I) Hydrofluoric, sulfuric or nitric acid plants
 - (J) Petroleum refineries
 - (K) Lime plants
 - (L) Phosphate rock processing plants
 - (M) Coke oven batteries
 - (N) Sulfur recovery plants
 - (O) Carbon black plants, furnace process
 - (P) Primary lead smelters
 - (Q) Fuel conversion plants
 - (R) Sintering plants
 - (S) Secondary metal production plants
 - (T) Chemical process plants
 - (U) Fossil-fuel boilers, or combination thereof, totaling more than 250 million Btus per hour heat input
 - (V) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
 - (W) Taconite ore processing plants
 - (X) Glass fiber-processing plants
 - (Y) Charcoal production plants
 - (Z) Fossil-fuel-fired steam electric plants of more than 250 million Btus per hour heat input

- (AA) Other stationary source categories regulated by a standard promulgated under section 111 or 112 of the Clean Air Act, but only with respect to air contaminants that have been regulated for that category, when required by the Clean Air Act or the regulations thereunder.
- (iii) A major stationary source as defined in Title I, Part D of the Clean Air Act (42 U.S.C.A. §§ 7501—7515), including:
 - (A) For ozone non-attainment areas, sources with the potential to emit 100 tpy or more of VOCs or NO_x in areas classified as “marginal” or “moderate,” 50 tpy or more in areas classified as “serious,” 25 tpy or more in areas classified as “severe” and 10 tpy or more in areas classified as “extreme.”
 - (B) For ozone transport regions established under section 184 of the Clean Air Act (42 U.S.C.A. § 7511c), sources with the potential to emit 50 tpy or more, of VOCs or 100 tpy or more of oxides of NO_x.
 - (C) For carbon monoxide non-attainment areas that are classified as “serious,” and in which stationary sources contribute significantly to carbon monoxide levels as determined under rules issued by the Administrator of the EPA, sources with the potential to emit 50 tpy or more of carbon monoxide.
 - (D) For particulate matter (PM-10) non-attainment areas classified as “serious,” sources with the potential to emit 70 tpy or more of PM-10.
- (iv) A source located at a facility that does not meet the requirements of subparagraphs (i)- (iii) after the Administrator of the EPA completes a rulemaking requiring regulation of those sources under Title V of the Clean Air Act (42 U.S.C.A. §§ 7661-7661f).

Title V permit

An operating permit issued by the Department to a Title V facility.

Title V regulated air pollutant

For purposes of the requirements of Title V of the Clean Air Act, the term means one or more of the following:

- (i) NO_x or VOCs.
- (ii) An air contaminant for which a National Ambient Air Quality Standard has been promulgated.
- (iii) An air contaminant that is subject to a standard promulgated under section 111 of the Clean Air Act.
- (iv) A Class I or II substance subject to a standard promulgated under or established by Title VI of the Clean Air Act (42 U.S.C.A. §§ 7671-7671g).
- (v) An air contaminant subject to a standard promulgated under section 112 or other requirements established under section 112 of the Clean Air Act, including subsections (g), (j) and (r), including the following:
 - (A) An air contaminant subject to requirements under section 112(j) of the Clean Air Act. If the Administrator of the EPA fails to promulgate a standard by the date established under section 112(e) of the Clean Air Act, an air contaminant for which a subject source would be major shall be considered to be regulated on the date 18 months after the applicable date established under section 112(e) of the Clean Air Act.

- (B) An air contaminant for which the requirements of section 112(g)(2) of the Clean Air Act have been met, but only with respect to the individual source subject to a section 112(g)(2) requirement.

Agency Contact

For further information contact a Facilities Permitting Chief from the appropriate DEP Regional Office:

Southeast Regional Office
2 East Main Street
Norristown, PA 19401
Telephone: (484) 250-5920

Northeast Regional Office
Two Public Square
Wilkes-Barre, PA 19711-0790
Telephone: (570) 826-2531

Southcentral Regional Office
909 Elmerton Avenue
Harrisburg, PA 17110
Telephone: (717) 705-4702

Northcentral Regional Office
208 West 3rd Street, Suite 101
Williamsport, PA 17701
Telephone: (570) 327-3637

Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745
Telephone: (412) 442-4174

Northwest Regional Office
230 Chestnut street
Meadville, PA 16335-3481
Telephone: (814) 332-6940

Description

Title V is a comprehensive operating permit program that specifies all federally enforceable air regulations applicable to a facility in one document.

Statute/Regulation

The Clean Air Act (42 USC §§7401 et seq.); 40 CFR Part 70. Pennsylvania Code §127.501–§127.543.

Required/Suggestions

Facilities subject to Part 70 must submit an application within one year of applicability to the Title V program that describes all sources of air pollution and quantifies emissions from those sources. The application must identify all applicable federally enforceable requirements to those sources as well.

Application Process

The facility submits an application on forms developed by the Bureau of Air Quality. This application will contain the information necessary to describe all air pollution sources and quantify emissions from these sources.

Review Process

Within 60 days of receipt of a Title V application, a completeness review is made. After the application is deemed administratively complete, a technical review is performed. When a permit is drafted, it undergoes several reviews, including one by the facility. A public notice of the draft permit is then issued for a 30-day public comment period; if comments are received, the draft is either revised and re-noticed or a reply to the comments is issued and the permit goes to the EPA for a 45-day comment period, after which these comments (if any) are addressed and the permit is finalized.

Review/Approval Period

All Title V operating permits must be issued within 18 months of receipt.

Fees

Collection of emission fees is necessary to fund the Title V Program. Emissions fees are adjusted annually, as appropriate, to sufficiently fund the Title V program. Application fees do apply.

Landfills

For non-major source (i.e., non-Title V) and major source landfills, the Bureau of Air Quality has established a guidance document titled Air Quality Permitting Criteria Including Best Available Technology Criteria For Municipal Waste Landfills. This document can be found at:

www.dep.state.pa.us/info.htm

(Click Air Quality; click Regs/Plans; click Technical Guidance; click Best Available Technology and Other Permitting Criteria—Effective February 23, 1996).

For non-major source landfills, contact a New Source Review Chief at the appropriate DEP Regional Office:

Southeast Regional Office
2 East Main Street
Norristown, PA 19401
Telephone: (484) 250-5920

Northeast Regional Office
Two Public Square
Wilkes-Barre, PA 19711-0790
Telephone: (570) 826-2531

Southcentral Regional Office
909 Elmerton Avenue
Harrisburg, PA 17110
Telephone: (717) 705-4702

Northcentral Regional Office
208 West 3rd Street, Suite 101
Williamsport, PA 17701
Telephone: (570) 327-3637

Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745
Telephone: (412) 442-4174

Northwest Regional Office
230 Chestnut street
Meadville, PA 16335-3481
Telephone: (814) 332-6940

Table 3.1 **A Summary Table for Pennsylvania Department of Environmental Protection Regulations/Permits**

| Standard | Permit Agency/Contact | Length of review period |
|---------------------------------|---|-------------------------|
| Minor, Major Modification or GP | DEP Division of Municipal and Residual Waste P.O. Box 8472 Harrisburg, PA 17105-8472 (717) 787-7381 | 2 to 6 months |
| Bureau of Air Quality | Air Pollution Control Engineer or Air Quality Program Specialist | Up to 18 months |

3. Overview of Local Regulations and Permits

Within the framework of federal regulations and state of Pennsylvania regulations, local governments will have some jurisdiction over landfill gas (LFG) development in nearly all cases. Typically, local permits address issues that affect the surrounding community. These permits generally fall under the categories of construction, environment and health, land use, and water quality/use. In addition to issuing their own permits, local governments are also responsible for administering some permits for federal and state of Pennsylvania regulations. For example, some local governments are responsible for ensuring compliance with federal air quality regulations. It should be noted, however, that some local standards and regulations are stricter than state or federal regulations.

3.1. Steps to Successful Local Permits Approval

The following seven steps will help LFG project developers successfully obtain local permits approval.

- Step 1. Determine which local authorities have jurisdiction over the project site.
- Step 2. If necessary, determine route for LFG pipes and contact easement officials to get easements/right of ways.
- Step 3. Contact local, city and/or county planning, and public works departments to obtain information about applicable permits and to discuss your plans. Meeting with agency staff to discuss the LFG project and required permits often helps to expedite the permitting process.
- Step 4. Obtain essential information regarding each permit, including:
 - What information is required.
 - The permitting process that should be followed.
 - Time frames, including submittal, hearing, and decision dates.
- Step 5. Obtain copies of the regulations to compare and verify what is required in the permit applications. If they differ, contact the appropriate permitting agency.
- Step 6. Prepare and provide background information on the environmental benefits of the project, including:
 - Current emissions from existing LFG control system.
 - Projected reduction in emissions from existing LFG control system.
 - Projected emissions from LFG beneficial use.
 - Emissions offset by LFG beneficial use (i.e. emissions/kwh or emissions/Btu from fossil fuels).
 - Net emissions from LFG beneficial use.
- Step 7. Submit a complete application. Incomplete applications typically result in processing delays.
- Step 8. Attend meetings or hearings where the application will be discussed to respond to any questions that are raised. Failure to do so could result in delays.

3.2. Typical Local Permits

Building Permit

Most county or local governments require building permits for construction. These permits require compliance with several types of building codes, such as plumbing and electrical. A typical building permit application may require detailed final plans for structures, including electrical and plumbing plans, floor layout, sewage facilities, storm water drainage plan, size and shape of lot and buildings, setback of buildings from property lines and drain field, access, size and shape of foundation walls, air vents, window access, and heating or cooling plants (if included in the design).

Zoning/Land Use

Most communities have a zoning and land use plan that identifies where different types of development are allowed (i.e., residential, commercial, and industrial). The local zoning board determines whether a particular project meets local land use criteria and can grant variances if conditions warrant. An LFG project may require an industrial zoning classification.

Storm Water Management

Some local public works departments require a permit for discharges during construction and operation of an LFG project. Good facility design that maintains the pre development runoff characteristics of the site will typically enable the project to meet permitting requirements easily.

Wastewater

The primary types of wastewater likely to be generated by an LFG project include maintenance wastewater and cooling tower blow down. The local authority or municipal officials should be contacted to provide information about available wastewater handling capacity and any unique condensate treatment requirements or permits for landfills.

Fire Hazards and Precautions

The mix of gases in LFG has a moderate to high explosion potential; methane is explosive in concentrations of 5 to 15 percent in air. Because methane has the potential to migrate from the landfill to onsite or offsite structures, it poses a significant public safety hazard. EPA requires that methane concentrations be less than 5 percent at a landfill property line, and less than 2.5 percent of the lower explosive limit (LEL) in a facility's structures. County regulations may call for even stricter standards to be observed at the landfill. Local fire departments often require material safety data sheets for LFG.

Noise

Most local zoning ordinances stipulate the maximum allowable decibel levels from noise sources. These levels vary depending on the location of the site. For example, LFG recovery projects located near residential areas will likely have to comply with stricter noise level standards than projects located in non-populated areas.

3.3. Local Health Departments

The Pennsylvania Department of Health's Web site, shown below, contains information for City and County health Departments.

www.dsf.health.state.pa.us/health/CWP/view.asp?A=180&QUESTION_ID=199412

Part 2: Incentive Programs

1. Overview of Federal Incentive Programs

Several federal incentive programs have traditionally applied to landfill gas (LFG) energy projects: the Section 29 Tax Credit, the Renewable Energy Production Incentive (REPI), and the Qualifying Facilities (QF) Certification. In October 2004, Congress extended and amended the Section 45 Production Tax Credit to include LFG electricity projects.

However, as of June 2005, these programs might all be affected by evolving energy legislation. Currently, the REPI incentive and the Section 29 tax credit are not available to new projects. Projects that have already qualified for Section 29 tax credits are eligible to receive the tax credit until 2007. The QF Certification is still available but has been removed from current drafts of the energy bill legislation. Information about the Section 45, Section 29, and QF Certification credits are provided below.

For the latest updates on state and federal incentives, please refer to the following sources:

- LMOP's Funding Guide—<http://www.epa.gov/lmop/res/index.htm#1>
- Database for State Incentives for Renewable Energy—<http://www.dsireusa.org>

1.1. Qualifying Facilities Certification

LFG projects that generate electricity will benefit from Qualifying Facilities (QF) certification, which is granted through the Federal Energy Regulatory Commission (FERC). The following describes the benefits of QF status and the steps for applying for such status.

The Public Utility Regulatory Policies Act (PURPA), one of five parts of the National Energy Act of 1978, was designed to promote energy conservation and security by removing barriers to the development of cogeneration facilities and facilities that use waste fuels or renewable fuels. Such facilities are called Qualifying Facilities (QF). Under PURPA, utilities are required to purchase electricity from QF at each utility's avoided cost of generating power. PURPA provides that a small power production facility, such as a LFG project that meets FERC standards, can become a QF.

To apply for QF status, applicants must prepare either (1) a Notice of Self-Certification, which asserts compliance with FERC technical and ownership criteria, or (2) an Application for Commission Certification of Qualifying Status, which requires a draft Federal Register notice and which provides actual FERC approval of QF status. In either case, the applicant must also file Form 565, which is a list of questions about the project, and must pay any filing fees associated with certifications, exemptions, and other activities. FERC will provide the QF "Info Packet" that describes the necessary steps, requirements, and background information. After submitting the initial application, the applicant may be asked to provide further justifications and submittal of information. To obtain the QF information and application packet, contact:

Federal Energy Regulatory Commission
Qualifying Facilities Division
825 North Capitol Street, N.E.
Washington, DC 20426
Phone: (202) 208-0577
www.ferc.fed.us

Again, please check the status for QF Certification when energy legislation is implemented.

1.2. Section 29 Tax Credit

Developers of LFG projects who sell LFG to an unrelated third party may qualify for a tax credit under Section 29 of the Internal Revenue Service (IRS) tax code. In order to take advantage of the Section 29 credit, project developers may bring in an outside party when developing power projects. The Section 29 tax credit was established in 1979 to encourage development of unconventional gas resources, such as LFG. Section 29 tax credits are available through 2007 to LFG projects with a contract in place as of December 31, 1996 and that were placed in service by June 30, 1998. The credit has been extended several times by the U.S. Congress, but there is no guarantee that these extensions will continue. The credit is worth \$3.00 per barrel of oil-equivalent (on a MM Btu basis) and is adjusted annually for inflation. Currently, it is worth \$0.979 per MM Btu, which is approximately 1.2 ¢/kWh for a typical LFG electricity project. This credit applies to existing projects only.

1.3. Section 45 Tax Credit

The expanded Section 45 tax credit is available for electricity produced from LFG, open loop biomass (including waste wood and agricultural livestock waste nutrients), trash combustion, geothermal, solar, and small irrigation power facilities that are placed in service prior to January 1, 2006. The credit is \$0.009/kW-hr paid out over a period of five years. "Placed in service" refers to having the electricity generator sets (GENCO) in place prior to the January 1, 2006 deadline. The project does not have to be generating electricity by January 1, 2006 but must be ready to generate electricity. In addition to having the GENCO in place, it is also advisable to have the power purchase and interconnection agreements in place prior to January 1, 2006.

2. State of Pennsylvania Incentive Programs

2.1. Office of Energy and Technology Development

An incentive for LFG energy projects offered by the Office of Energy and Technology Development (OETD) is provided as grant funding through the Energy Harvest Grant Program. The Energy Harvest Grant Program provides funds for projects that promote and build markets for advanced or renewable energy technologies. The intent is to provide a stimulus for opportunities that better manage our energy resources in a way that also improves our environment, supports economic development, and enhances our quality of life. Energy Harvest is not a research initiative. It is about deployment of new and innovative technologies in the market place. Energy Harvest is particularly interested in supporting proposals that are market-driven, create jobs, and produce economic development within the Commonwealth. Energy Harvest is a yearly grant offering from DEP.

Another incentive program under the purveyance of OETD is the Alternative Fuels Incentive Grant Program (AFIG). This program could provide funding for LFG projects if the project cleans and liquefies the methane into a compressed natural gas or a liquefied natural gas to be used in transportation vehicles. The AFIG Program provides financial assistance for these portions of a project: purchasing alternative fuel vehicles; converting or repowering existing vehicles to operate on an alternative fuel; purchasing and installing alternative fuel refueling facilities; purchasing and installing recharging facilities; developing and evaluating innovative alternative fuel vehicles; and developing refueling or recharging facilities.

2.2. Act 198 for Waste Minimization

Pennsylvania's Solid Waste—Resource Recovery Development Act of 1974 (Act 198) demonstration grant program provides financial assistance to establish resource recovery projects in Pennsylvania that recover at least 50 percent materials or energy from solid waste entering into the system. Only a select number of unique and innovative projects are funded each year. The grant provides up to 75 percent of the costs associated with developing resource recovery projects and cannot exceed \$100,000. Any county, municipality, or county or municipal authority in Pennsylvania is eligible to apply for the grant. A Pennsylvania private or non-profit sector entity may partner with a public entity to apply for mutually beneficial demonstration projects.

3. Electricity Restructuring and Landfill Gas Energy

3.1. What Is Electricity Restructuring?

Electricity restructuring refers to the introduction of competition into both the wholesale and retail electricity markets. Until recently, electric utilities operated as monopolies authorized as the sole provider of electric service to consumers within a specific service territory. Under restructuring, electric energy is no longer treated as a natural monopoly but instead is treated as a commodity, and new energy suppliers can enter the marketplace. Electric distribution (the wires and poles) is still treated as a regulated monopoly. (A single electric distribution company can provide better and cheaper service than two or three different companies running duplicate poles and wires.) With more energy suppliers, there are more energy options for consumers, including renewable energy sources.

Efforts to restructure the electric utility industry began in 1978 with passage of the Public Utilities Regulatory Policies Act (PURPA), which required utilities to purchase power from independent power producers in an effort to encourage the development of smaller generating facilities, new technologies, and renewable energy sources. The National Energy Policy Act (EPACT) of 1992 expanded on PURPA, effectively creating a competitive wholesale market for electric power.

Many states, including Pennsylvania, have enacted some form of restructuring legislation, while others are considering action. The status of the state of Pennsylvania electric industry restructuring activity is available at the Energy Information Agency Web site:

www.eia.doe.gov/cneaf/electricity/chg_str/tab5rev.html

In 1999, Pennsylvania adopted the Electricity Generation Customer Choice & Competition Act. The full text of the act is available at:

www2.legis.state.pa.us/WU01/LI/BI/BT/1995/0/HB1509P4282.pdf

The Electricity Generation Customer Choice & Competition Act enables Pennsylvania companies and residents to shop for electric suppliers. As of March 2004, there were 46 licensed competitive electric generation suppliers (EGS) in Pennsylvania. Eight electric generation suppliers offer 15 energy supply products to residential customers in Pennsylvania. There are several renewable energy supply offerings with Green Mountain Energy serving all territories. Green Mountain Energy offers either a 50 or 100 percent renewable option. Community Energy offers a 100 percent "New Wind Energy Renewable Add-On" option in all territories except Allegheny. Additional renewable and standard energy supply offerings are available in PECO service territory, and the suppliers include Electric America, Energy Cooperative Association, Power Choice, and ACN Energy.

A quarterly report on utility competition in Pennsylvania is available at:

www.puc.paonline.com/com_info/Commission%20Reports/comm_rpts.asp#Keystone%20Competition

A list of licensed electric suppliers is available at:

www.puc.paonline.com/electric/eleclist.asp

Additional information on electric competition can be found at:

www.utilitychoice.org and www.oca.state.pa.us.

3.2. Effect of Renewable Energy Programs on LFG Recovery

Many states are establishing mandatory renewable energy provisions. Such provisions mandate electric suppliers to include a certain percentage of electricity generated from renewable, or "green energy," sources into their energy mixes. LFG is one such green energy source. These mandatory provisions are generally defined as renewable portfolio standards.

Pennsylvania is considering several renewable programs. There is draft legislation that would provide for the acquisition or sale of electricity energy generated from renewable and environmentally beneficial sources. The standards establish a certain amount of renewable energy be included as part of the sources of electric generation by the electric utilities within Pennsylvania. The drafts differ on the timing of implementation, ranging from 10 to 15 years, with varying annual ranges for phase in periods.

Pennsylvania has launched some major initiatives to build a clean, diversified energy industry in the state, including a second round for the Pennsylvania Energy Harvest grant program, which encourages clean and renewable energy projects.

Pennsylvania has a green power initiative with the state government purchasing 10 percent of its energy from renewable energy sources. Building on the leadership position of having already doubled the amount of “green” energy that Pennsylvania uses, the Governor has directed agencies to redouble that effort to 20 percent.

Pennsylvania has also revitalized the Energy Development Authority to provide financing to help build clean power plants. The Pennsylvania administration also has proposed an Advanced Energy Portfolio Standard to ensure that in 10 years, 10 percent of all of the energy generated in the commonwealth comes from clean, efficient sources.

The electric utility industry restructuring process in Pennsylvania brought together stakeholder groups as active participants. These groups contributed to restructuring settlements for Metropolitan Edison Company (Met-Ed), Pennsylvania Electric Company (Penelec), PECO Energy (PECO), PP&L (PPL), and Allegheny Power/West Penn Power Company (WPP). These settlements provided new opportunities for renewable and sustainable energy production services and enterprises.

Each of the five settlement agreements established a separate and independent sustainable energy fund to promote:

- The development and use of renewable energy and clean energy technologies.
- Energy conservation and energy efficiency.
- Renewable energy business initiatives.
- Projects, which improve the environment in the Companies’ service territories, related to the transmission and distribution facilities (Met Ed & Penelec).

3.3. Marketing LFG Recovery as Green Power

Under federal law (PURPA sec. 210) utilities are required to buy electricity from small (i.e., less than 80 MW) renewable projects. However, utilities will buy the power only at wholesale energy prices, which are often 2.5 cents/kWh or less.

A more promising development in electric competition is the success of green energy marketers. Electricity from LFG projects could be sold to and marketed by one of these green marketers as premium products and collect a premium price from their customers. Electric marketers offering renewable energy options in Pennsylvania include: Green Mountain, Community Energy, Electric America, Energy Cooperative Association, Power Choice, and ACN Energy.

In addition, green marketing allows energy marketers to differentiate their energy product. However, the general public is less familiar with LFG than other sources of renewable energy; support from LMOP can help ensure the success of LFG green marketing efforts.

Other useful links are: www.ferc.gov/ and www.eia.doe.gov/.

4. Voluntary Reporting of Greenhouse Gases Program

The Voluntary Reporting of Greenhouse Gases Program, created by Congress under Section 1605(b) of the Energy Policy Act of 1992, provides an opportunity for any company, organization, or individual to establish a public record of their greenhouse gas emissions, reductions, or sequestration achievements in a national database. The data submitted to the program is made publicly available via CD-ROM and the Internet. Those who report to 1605(b) can gain recognition for environmental stewardship, demonstrate support for voluntary approaches to achieving environmental policy goals, support information exchange, and inform the public debate about greenhouse gas emissions.

Additional information about the program, as well as reporting forms and technical assistance, are available through:

Energy Information Administration's Communications Center
202-586-0688
800-803-5182
E-mail at infoghg@eia.doe.gov
www.eia.doe.gov/oiaf/1605/frntvrhg.html.